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Attorney's Docket No.: 10017809-1
Amendment dated Feb. 3, 2005
Reply to Office action dated Nov. 9, 2004

1.   Claims 1-5, 13, 14, and 24

Claim 1 is an independent claim. Claims 2-5, 13, 14, and 24 depend from independent claim 1.

Independent claim 1 recites in part "updating the one or more pixel-level historical models based at least in part upon one or more feedback maps identifying pixels respectively segmented into the one or more labeled groups in conformity with a spatially non-local segmentation model."

The Examiner has indicated that "Grimson does not expressly disclose that the feedback maps for updates identifies pixels respectively segmented into labeled groups *in conformity with a spatially non-local segmentation model* (original emphasis)." Indeed, Grimson does not update his background model based on any type of spatially non-local segmentation model feedback. Instead, Grimson updates his per-pixel mixture of Gaussians background model based only on local pixel-level observations (see page 30, last 3 lines of the left column to the end of the first full paragraph of the right column).

The Examiner has relied on Bhat in an attempt to make-up for Grimson's failure to teach or suggest "updating the one or more pixel-level historical models based at least in part upon one or more feedback maps identifying pixels respectively segmented into the one or more labeled groups in conformity with a spatially non-local segmentation model." In particular, the Examiner has asserted that:

> However, Bhat teaches/suggests using labeled foreground
> groups resulted from spatially non-local segmentation to update
> a decision process based on a background model. [See p. 1578:
> Sect. 3, lines 14-17; Sect. 3.1, last paragraph; Sect. 3.2, 1st
> paragraph. Note that lines 2-4 of Sect. 3.2 indicate that pixels
> are classified into groups such as "people", which implies the
> employment of non-local spatial information, as is obvious to
> one of ordinary skill in the art. (See, for example, the
> disclosure by Grimson discussed above in which aspect ratio
> and size are used.)]

Contrary to the Examiner's implication, however, claim 1 does not recite "using labeled foreground groups resulted from spatially non-local segmentation to update a decision process based on a background model." Instead, claim 1 clearly recites "updating the one or more pixel-level historical models based at least in part upon one or more feedback

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maps identifying pixels respectively segmented into the one or more labeled groups in conformity with a spatially non-local segmentation model."

Bhat's feedback mechanism is used only to update the rule for classifying a pixel as foreground or background. Bhat does not update his background model "based at least in part upon one or more feedback maps identifying pixels respectively segmented into the one or more labeled groups in conformity with a spatially non-local segmentation model." To the contrary, Bhat's background model is updated based only on local pixel-level observations. In particular, Bhat teaches that (§ 3.1, lines 11-20):

> At each step, we wish to gradually minimize the difference between the background model $B_{n,x,y} = B_{(n-1),x,y} + \eta D_{n,x,y}$, where η represents the learning rate constant. The update rule can also be posed as an AR filter, as shown in equation (1). Rather than mak-

$$B_{n,x,y} = (1-\eta)B_{(n-1),x,y} + \eta I_{n,x,y} \qquad (1)$$

> ing the threshold $b_{n,x,y}$ a constant, we adapt it just as we adapt the background, using an AR filter.

Equation (1) clearly shows that the background model is updated only based on the local pixel level observations $I_{n,x,y}$. Bhat's feedback mechanism acts only to modify the weights $\omega_0, \omega_1, \omega_2$ in the classification rule described in Section 3.2, and these weights are not part of Bhat's pixel-level background model.

To summarize, neither Grimson nor Bhat teaches or suggests "updating the one or more pixel-level historical models based at least in part upon one or more feedback maps identifying pixels respectively segmented into the one or more labeled groups in conformity with a spatially non-local segmentation model." Therefore, no permissible combination of Grimson and Bhat possibly could teach or suggest this feature of independent claim 1.

For at least these reasons, the Examiner's rejection of independent claim 1 under 35 U.S.C. § 103(a) over Grimson in view of Bhat should be withdrawn.

Each of claims 2-5, 13, 14, and 24 incorporates the features of independent claim 1 and therefore is patentable over Grimson and Bhat for at least the same reasons.

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2.   Claims 25-29, 37, and 38

Claim 25 is an independent claim. Claims 26-29, 37, and 38 depend from independent claim 25.

Independent claim 25 recites that the system comprises one or more processing modules operable to in part "update the one or more pixel-level historical models based at least in part upon one or more feedback maps identifying pixels respectively segmented into the one or more labeled groups in conformity with a spatially non-local segmentation model."

The Examiner's rejection of independent claim 25 under 35 U.S.C. § 103(a) over Grimson in view of Bhat should be withdrawn for the same reasons explained above in connection with claim 1.

Each of claims 26-29, 37, and 38 incorporates the features of independent claim 25 and therefore is patentable over Grimson and Bhat for at least the same reasons.

3.   Claim 45

Independent claim 45 recites that the computer program comprise computer-readable instructions for causing a computer to in part "update the one or more pixel-level historical models based at least in part upon feedback maps identifying pixels respectively segmented into the one or more labeled groups in conformity with a spatially non-local segmentation model."

The Examiner's rejection of independent claim 45 under 35 U.S.C. § 103(a) over Grimson in view of Bhat should be withdrawn for the same reasons explained above in connection with claim 1.

B.   Claims 6-9 and 30-33

The Examiner has rejected claims 6-9 and 30-33 under 35 U.S.C. § 103(a) over Grimson in view of Bhat and Javidi (U.S. 5,699,449).

Claims 6-9 incorporate the features of independent claim 1 and claims 30-33 incorporate the features of independent claim 25.

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Javiti does not make-up for the failure of Grimson and Bhat to teach or suggest "updating the one or more pixel-level historical models based at least in part upon one or more feedback maps identifying pixels respectively segmented into the one or more labeled groups in conformity with a spatially non-local segmentation model." Indeed, Javiti does not teach or suggest anything about maintaining a pixel-level historical model, much less anything about updating such a model based at least in part upon one or more feedback maps identifying pixels respectively segmented into the one or more labeled groups in conformity with a spatially non-local segmentation model.

Therefore, claims 6-9 and 30-33 are patentable over Grimson, Bhat, and Javiti for at least the same reasons explained above in connection with independent claims 1 and 25.

C.   Claims 10, 11, 34, and 35

The Examiner has rejected claims 10, 11, 34, and 35 under 35 U.S.C. § 103(a) over Grimson in view of Bhat, Javidi, and Goldenthal (U.S. 5,625,749).

Claims 10 and 11 incorporate the features of independent claim 1 and claims 34 and 35 incorporate the features of independent claim 25.

Goldenthal does not make-up for the failure of Grimson, Bhat, and Javidi to teach or suggest "updating the one or more pixel-level historical models based at least in part upon one or more feedback maps identifying pixels respectively segmented into the one or more labeled groups in conformity with a spatially non-local segmentation model." Indeed, Goldenthal does not teach or suggest anything about maintaining a pixel-level historical model, much less anything about updating such a model based at least in part upon one or more feedback maps identifying pixels respectively segmented into the one or more labeled groups in conformity with a spatially non-local segmentation model.

Therefore, claims 10, 11, 34, and 35 are patentable over Grimson, Bhat, Javiti, and Goldenthal for at least the same reasons explained above in connection with independent claims 1 and 25.

The Examiner has asserted that the "combined invention of Grimson, Bhat and Javidi is combinable with Goldenthal because they have aspects that are from the same field of segmentation/classification." Goldenthal's disclosure, however, relates to automatic speech recognition systems and methods and has nothing whatsoever to with the vision systems

described in Grimson and Bhat. Indeed, Goldenthal does not teach or suggest anything about maintaining a pixel-level historical model. It appears that the Examiner improperly has engaged in hindsight reconstruction of the claimed invention, using applicants' disclosure as a blueprint for piecing together prior art to defeat patentability. Without a proper explanation for combining the cited prior art, the Examiner has failed to establish a proper *prima facie* case of obviousness and the rejection of claims 10, 11, 34, and 35 should be withdrawn for at least this additional reason.

D.   Claims 12 and 36

The Examiner has rejected claims 12 and 36 under 35 U.S.C. § 103(a) over Grimson in view of Bhat, Javidi, Goldenthal, and Tresp (U.S. 6,272,480).

Claim 12 incorporates the features of independent claim 1 and claim 36 incorporates the features of independent claim 25.

Tresp does not make-up for the failure of Grimson, Bhat, Javiti, and Goldenthal to teach or suggest "updating the one or more pixel-level historical models based at least in part upon one or more feedback maps identifying pixels respectively segmented into the one or more labeled groups in conformity with a spatially non-local segmentation model." Indeed, Tresp does not teach or suggest anything about maintaining a pixel-level historical model, much less anything about updating such a model based at least in part upon one or more feedback maps identifying pixels respectively segmented into the one or more labeled groups in conformity with a spatially non-local segmentation model.

Therefore, claims 12 and 36 are patentable over Grimson, Bhat, Javidi, Goldenthal, and Tresp for at least the same reasons explained above in connection with independent claims 1 and 25.

The Examiner has asserted that the "combined invention of Grimson, Bhat, Javiti, and Goldenthal is combinable with Tresp because they have aspects that are from the same field of endeavor of modeling." Tresp's disclosure, however, relates to neural modeling of a dynamic system with non-linear stochastic behavior that is used "to predict values of the glucose-insulin metabolism of a diabetes patient" (Abstract). This disclosure has nothing whatsoever to with the vision systems described in Grimson and Bhat. Indeed, Tresp does not teach or suggest anything about maintaining a pixel-level historical model. It appears that

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the Examiner improperly has engaged in hindsight reconstruction of the claimed invention, using applicants' disclosure as a blueprint for piecing together prior art to defeat patentability. Without a proper explanation for combining the cited prior art, the Examiner has failed to establish a proper *prima facie* case of obviousness and the rejection of claims 12 and 36 should be withdrawn for at least this additional reason.

E.   Claims 15, 22, and 23

The Examiner has rejected claims 15, 22, and 23 under 35 U.S.C. § 103(a) over Grimson in view of Bhat and Gordon (U.S. 6,661,918).

Claim 15, 22, and 23 incorporate the features of independent claim 1.

Gordon does not make-up for the failure of Grimson and Bhat to teach or suggest "updating the one or more pixel-level historical models based at least in part upon one or more feedback maps identifying pixels respectively segmented into the one or more labeled groups in conformity with a spatially non-local segmentation model." Indeed, like Grimson and Bhat, Gordon updates his background model based only on local pixel-level observations (see col. 5, line 43 through col. 6, line 12).

Therefore, claims 15, 22, and 23 are patentable over Grimson, Bhat, and Gordon for at least the same reasons explained above in connection with independent claim 1.

F.   Claims 16-21 and 39-44

The Examiner has rejected claims 16-21 and 39-44 under 35 U.S.C. § 103(a) over Grimson in view of Bhat and Owechko (U.S. 6,801,662).

Claims 16-21 incorporate the features of independent claim 1 and claims 39-44 incorporate the features of independent claim 25.

Owechko does not make-up for the failure of Grimson and Bhat to teach or suggest "updating the one or more pixel-level historical models based at least in part upon one or more feedback maps identifying pixels respectively segmented into the one or more labeled groups in conformity with a spatially non-local segmentation model." Indeed, Owechko does not teach or suggest anything about maintaining a pixel-level historical model, much less anything about updating such a model based at least in part upon one or more feedback maps